Syllabus for CSE030-01: Data Structures

Spring 2016
Instructor: Chi Yan Daniel Leung

Designation: Data Structures
Catalog Description: Through the course of this semester, we will explore C++, object-oriented programming, recursion, analysis of algorithms, and data structures such as: vectors, queues, stacks, lists, trees and graphs.


Suggested references:
http://www.cplusplus.com/
http://www.cplusplus.com/doc/tutorial/

Course Objectives/Student Learning Outcomes:
1. Correctly use recursion to solve a problem with a binary search tree or graph
2. Determine the Big-O speed of an algorithm.
3. Correctly implement the right data structure for a given problem
4. Correctly determine the relative runtimes of different algorithms
5. Analyze unstructured problems and design computer solutions
6. Apply or create suitable algorithm to solve a particular problem.

Program Learning Outcomes: This course relates to the following program learning outcomes:
An ability to apply knowledge of computing and mathematics appropriate to the discipline;
An ability to analyze a problem and identify the computing requirements appropriate for its solution; An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs, and use current techniques, skill, and tools necessary for computing practice.
An ability to apply mathematical foundations, algorithmic principles, and computer science theory to the modeling and design of computer based systems in a way that demonstrates comprehension of the trade-offs involved in design choices.

Prerequisites by Topic: CSE20/21 combination or equivalent knowledge

Course Policies:
For this course, you are not required to have your own computer. It is expected that you will do all lab assignments during your designated lab time, in the computer lab for this course. Computers are NOT needed for tests or for any in-lecture activities. Please do not bring laptops or mobile gaming devices to lecture.

It is not necessary for you to have your own computer for this course, as all computing resources necessary will be provided in the lab. Lab assignments are designed to be completed within the designated weekly lab sessions. However, if you do not complete a particular assignment during normal lab hours, you may use any Open Access lab to complete your work.
For LAB assignments, you may work together with other students if you wish or when assignment asks for explicit collaboration. Giving each other help in finding bugs and in understanding the assignment is encouraged. It is permissible to allow other students to see small portions of your code on-screen during lab, but you may not allow them to copy directly. In general, the deadline for submission for a LAB will be ONE WEEK after it is posted. You will have a chance to resubmit for one more day for full credit provided your original submission was before the lab deadline.

You are expected to attend the lab session for which you are enrolled, unless you make explicit arrangements with the professor. Lab sections are where you will get most of the information and learn so it is important to be there physically every week. Your participation grade will be a direct reflection of your lab attendance. Make-up exams and extension of deadlines will NOT be provided unless arrangements are made beforehand.

**Academic Dishonesty Statement:**

a. Each student in this course is expected to abide by the University of California, Merced's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work.
b. You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.
c. During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

**Disability Statement:**

Accommodations for Students with Disabilities: The University of California Merced is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

**Topics:**

C++: We will begin with a crash course in C++ programming, including keyboard and terminal I/O, file I/O, loops, logic constructs (if/then/else), and steadily build up our C++ knowledge as the semester progresses.

Object-Oriented Programming (OOP): Beginning with the basic concepts of OOP, we will explore the building blocks of the OOP paradigm - classes, templates, modular code, etc.

Recursion / Algorithmic Complexity: Part of writing good programs is knowing how good they are and where their weaknesses lie. We will explore the mathematical tools available to calculate how algorithms scale with the
complexity of their input.

Data Structures: This is what the majority of the class focuses on, using the skills we learn in the first half to develop useful data structures for organizing and representing data to solve real problems.

Class/laboratory Schedule:
Lecture: MW 6:00 - 7:15PM KOLLIG 217. Lab: T 1:30 - 4:20PM, 4:30-7:20PM, SCIENG138

Midterm/Final Exam Schedule:
This schedule is subject to change, but is tentatively set as follows:
Midterm: Wednesday, March 16 (in class)
Final: Thursday, May 12 3:00-6:00pm KOLLIG 217

Course Calendar:

Professional Component:
Assessment/Grading Policy:
Your grade will be determined (approximately) as follows and may change during the semester a little:
- 20% midterm
- 30% final exam
- 30% labs
- 15% homework
- 5% participation

Grades: if you get 90% of points you'll get at least an A-, 80% will give you at least a B-, and 70% at least a C-.

Coordinator:
Chi Yan (Daniel) Leung

Contact Information:
Email: cleung3@ucmerced.edu
I will try to answer your emails within 48 hours. However, I cannot answer email after 5:00 p.m. or on weekends. Please plan accordingly.

Office Hours:
T/R 10:30AM-12:30PM (AOA 126)
or by appointment